

NON-PUBLIC?: N
ACCESSION #: 9212310138
LICENSEE EVENT REPORT (LER)

FACILITY NAME: RIVER BEND STATION PAGE: 1 OF 4

DOCKET NUMBER: 05000458

TITLE: REACTOR SCRAM DUE TO FAILURES IN THE STEAM BYPASS
PRESSURE REGULATION SYSTEM
EVENT DATE: 11/24/92 LER #: 92-026-00 REPORT DATE: 12/23/92

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 96

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: L.A. ENGLAND, DIRECTOR - NUCLEAR TELEPHONE: (504) 381-4145
LICENSING

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On 11-24-92, at 00:54:49.9, the reactor scrammed from 96 percent power due to problems with the steam bypass and pressure regulator system. As a result of a mismatch between the "A" and "B" regulator outputs, the main turbine control valves changed position from approximately 35 percent open to 23 percent open. The resulting pressure increase caused a corresponding increase in reactor power. The plant then scrammed on high neutron flux. Therefore, this report is submitted pursuant to 10CFR50.73(a)(2)(iv) to document the reactor scram.

The root cause of the scram consisted of failures in the "A" pressure amplifier card, and the "B" pressure transmitter. These components have been replaced.

Failure of the pressure regulator is bounded by USAR chapter 15.2

"Increase In Reactor Pressure". The high neutron flux scram setpoint Units the peak fuel surface temperature and ensures that the minimum critical power ratio (MCPR) was still within the safety limit for this transient. All plant systems responded as expected and the reactor was placed in a safe shutdown condition.

END OF ABSTRACT

TEXT PAGE 2 OF 4

REPORTED CONDITION

On 11-24-92, at 00:54:49.9, the reactor scrammed from 96 percent power due to problems with the steam bypass and pressure regulator system. As a result of a mismatch between the "A" and "B" regulator outputs, the main turbine control valves changed position from approximately 35 percent open to 23 percent open. The resulting pressure increase caused a corresponding increase in reactor power. The plant then scrammed on high neutron flux. Therefore, this report is submitted pursuant to 10CFR50.73(a)(2)(iv) to document the reactor scram.

INVESTIGATION

On 11-20-92, during power ascension from a planned outage, a large deviation between pressure regulators was observed (approx. 15 percent, "A" was low) which caused a module 1 trip. Following a troubleshooting assessment and in accordance with previous operating experience, adjustments were made to the percent regulation dial potentiometer on the "A" pressure amplifier card to match the two regulator outputs. This adjustment was not a contributing factor to the scram on 11-24-92 as gain was actually increased to match the two regulator outputs. The module 1 trip was reset and power ascension was resumed.

Review of post-trip records revealed that on 11-24-92, when increasing power, the difference in regulator outputs was 16 percent. The "A" regulator had drifted low 16 percent since the adjustment on 11-20-92. At 95 percent power, regulator outputs should have been approximately 80 percent "A" was reading 64 percent, "B" was in control reading 80 percent. Emergency response information system (ERIS) time history plots show that at 00:54:48.6 the difference in regulator outputs caused the steam bypass pressure regulation system to swap to the "A" regulator. Thus, the reactor pressure regulation was automatically transferred from channel "B" to channel "A". Since the "A" regulator was 16 percent lower than "B", the control valves ramped in the close direction causing reactor pressure to increase. The nature of the fault detection circuits caused the "A" regulator to be selected because its gain was less than

the "B" regulator, making it appear to have changed the least over a given time period. This reduced gain may have also contributed to the scram by reducing the response of the control valves to the increasing reactor pressure. At 00:54:49.9 with the control valves having just been repositioned by the sluggish "A" regulator the reactor scrammed on high neutron flux.

Maximum average power range monitor (APRM) neutron flux was 121.6 percent and maximum pressure was 1033.8 psi. The main turbine remained on line for two minutes after the scram; therefore, the safety/relief valves did not lift. Following the turbine tri the bypass valves controlled

TEXT PAGE 3 OF 4

reactor pressure. Reactor feed pumps "A" "B" were secured, the master level controller was placed in manual, and the startup feedwater regulator valve was placed in service. Water level was restored to the normal range. All plant systems responded as expected and the reactor was placed in a safe shutdown condition.

ROOT CAUSE

The root cause of the scram consisted of the following failures:

- 1) The "A" pressure amplifier card was drifting. Subsequent troubleshooting of this card found that the minimum pressure setpoint bias was drifting up, which would cause the regulator output to decrease.
- 2) The "B" pressure transmitter output was not repeatable during calibration. This was discovered during troubleshooting for this event.

In addition, contributing factors were that the pressure amplifier lead/lag adjustments, resonator adjustments and compensator adjustments were improperly set up since initial plant startup. Excessive lag existed in the pressure amplifier adjustments which made the control system sluggish in response to a pressure transient such as the one which happened when the regulator swap occurred. This exacerbated the pressure transient and decreased the ability of the plant to sustain the transient without a scram.

The improper adjustment of the resonator and compensator cards was recognized by a vendor representative based on calculations he performed using as-built plant data supplied by GSU personnel.

All of these adjustments are one-time settings performed during startup testing which do not normally require re-adjustment. Thus, the adjustment efforts were not detected by GSU System Engineering personnel.

CORRECTIVE ACTION

As-found data was taken on both pressure regulators after the "A" regulator's percent regulation was returned to its original value of 3.16. The "A" pressure amplifier card would not calibrate. It was replaced. The new card was calibrated as per the vendor manual and an alignment simulating pressure setpoint, sensed pressure and a turbine flow reference was performed on both pressure

TEXT PAGE 4 OF 4

regulator channels. At this time the regulator outputs were within 1 percent of each other. The "B" pressure transmitter was replaced. In addition, a vendor representative was brought in to work with GSU personnel to readjust the pressure amplifier, resonator and compensator. All significant parameters were verified by post-maintenance testing to be properly adjusted. The control system was also verified to be functioning properly. The system was monitored during the entire power ascension phase and minor adjustments were made to optimize the performance of the system.

Preventive maintenance tasks will be reviewed and expanded as required to ensure periodic testing and/or calibration of appropriate system components.

SAFETY ASSESSMENT

Failure of the pressure regulator is bounded by USAR chapter 15.2 "Increase In Reactor Pressure". The high neutron flux scram setpoints limits the peak fuel surface temperature and ensures that the minimum critical power ratio (MCPR) was still within the safety limit for this transient. All plant systems responded as expected and the reactor was placed in a safe shutdown condition.

ATTACHMENT 1 TO 9212310138 PAGE 1 OF 2

GULF STATES UTILITIES COMPANY

RIVER BEND STATION POST OFFICE BOX 220 ST. FRANCISVILLE, LOUISIANA
70775

AREA CODE 504 635-6094 346-8651

December 23, 1992

RBG- 37942

File Nos. G9.5, G9.25.1.3

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Gentlemen:

River Bend Station - Unit 1
Docket No. 50-458

Please find enclosed Licensee Event Report No. 92-026 for River Bend Station - Unit 1. This report is submitted pursuant to 10CFR50.73.

Sincerely,

W. H. Odell
Manager - Oversight
River Bend Nuclear Group

LAE/JPS/FRC/DCH/LWS/kwm

ATTACHMENT 1 TO 9212310138 PAGE 2 OF 2

cc: U. S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011

NRC Resident Inspector
P.O. Box 1051
St. Francisville, LA 70775

INPO Records Center
1100 Circle 75 Parkway
Atlanta, GA 30339-3064

Mr. C.R. Oberg
Public Utility Commission of Texas
7800 Shoal Creek Blvd., Suite 400 North
Austin, TX 78757

Department of Environmental Quality
Radiation Protection Division
P.O. Box 82135
Baton Rouge, LA 70884-2135
ATTN: Administrator

*** END OF DOCUMENT ***
